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UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: **SUGATANI, Shinji, et al.**

Group Art Unit: **2814**

Serial No.: **10/634,839**

Examiner: **Howard Weiss**

Filed: **August 6, 2003**

P.T.O. Confirmation No.: **8605**

For: **MANUFACTURING METHOD OF SEMICONDUCTOR DEVICE AND  
SEMICONDUCTOR CHIP USING SOI SUBSTRATE**

**REQUEST FOR RECONSIDERATION**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

July 27, 2005

Sir:

In response to the Office Action dated **May 2, 2005**, Applicants respectfully request reconsideration of the 35 U.S.C. § 103(a) rejection of claims 1-5 as unpatentable over **Kato** (previously applied), **Freestone et al.** (previously applied), **Lin et al.** (previously applied) and newly-applied U.S. Patent 6,797,539 to Wada et al. (hereafter "**Wada et al.**").

Applicants' representative, William L. Brooks, conducted a personal interview with the Examiner on July 5, 2005.

In the interview, it was argued the distinction between a face being parallel to a principal plane and a face being parallel to the principal axis of that plane. In response, the Examiner argued that there are three (3) Miller indices for each of various planes in a cubic crystal, and that for the (100) plane there is an axis perpendicular to the plane ( $\langle 100 \rangle$ ) and two axes parallel to the plane ( $\langle 010 \rangle$  and  $\langle 001 \rangle$ ).

The Examiner noted that the recitation of “a direction of a crystallographic axis ...” in claim 1 implies that there are other crystallographic axes.

The Examiner’s Interview Summary is attached hereto, and the Examiner’s handwritten note reads as follows:

Agreed that specifying the axis would overcome the rejection. The principal axes are ones perpendicular to the principal plane and two axes parallel to the principal plane. These three axes are the principal axes. Applicant is invited to show where support for the axis of interest is normal to the plane.

Turning to the Office Action itself, the Examiner asserts:

Freestone et al. teach (e.g. Figures 1 to 3) to form scribe lines 4 only on the device formation layer 1 and parallel on a principle plane (and, therefore, parallel to a principle axis) to form wafers with smooth edges and less strain (Column 1 Lines 39-41).

Applicants respectfully disagree.

In this case, the [100] direction is perpendicular to the principal plane, and the [010] direction and the [001] direction are parallel to the principal plane. The scribe line of **Freestone et al.** is defined on the principal plane. Namely, the scribe line is parallel to the principal plane and perpendicular to the [100] direction.

However, the relationship between the scribe line and the [010] direction is unknown. The relationship between the scribe line and the [001] direction is also unknown. For example, the scribe line 1 shown in the reference is parallel to the [001] direction and perpendicular to the [010] direction. The scribe line 2 is neither parallel to nor perpendicular to principal axes [010] and [001]. Attached is a drawing figure that illustrates the relationship between the scribe line and the [010] direction and the [001] direction.

Judging from the Interview Summary, it appears that the Examiner asserts that the scribe line on the principal plane is perpendicular to the [100] direction, and therefore the scribe line is parallel to the [010] or the [001] direction. It is obvious that this assertion is incorrect.

**Freestone et al.** does not disclose that a scribe line is parallel to a principal axis.

In the device of **Freestone et al.**, the slice is obtained by cutting the ingot into more than one slice, and the slice is divided into sections (col. 1, lines 15-17).

Col. 1, lines 30-38 of **Freestone et al.** discloses:

“The method ... consists in cutting the slice along a plane substantially parallel to a principal plane of the crystal, scribing on the slice a pattern representing the lines of separation between the sections ...”.

The cutting step corresponds to the step of obtaining the slices from the ingot. The scribing step corresponds to the step of dividing the slice into sections. **Freestone et al.** states that the plane in the cutting step is parallel to the principal plane, but does not teach the direction of the scribe line formed in the scribing step.

In the present invention, the direction of the scribe line is limited.

In the present invention, the scribe line is not parallel to the crystallographic axis of the device formation layer, but parallel to the crystallographic axis of the supporting substrate where the supporting substrate is easy to be cleaved. Namely, the direction of the scribe line is not defined by the crystallographic axis of the device formation layer on which the scribe line is formed, but is instead defined by the crystallographic axis of the supporting substrate on which the scribe line is not formed.

The principal plane in Freestone et al. means the principal plane on which the scribe line 4 is formed.

The expression <110> in claim 3 denotes [110] and the other direction equivalent by symmetry to [110].

Thus, the 35 U.S.C. § 103(a) rejection should be reconsidered and withdrawn.

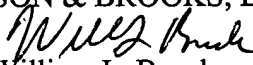
In view of the remarks above, claims 1-5 are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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PATENT TRADEMARK OFFICE

Enclosures: Interview Summary; and Attachment Drawing Figure

# Interview Summary



Application No.

10/634,839

Applicant(s)

SUGATANI ET AL.

Examiner

Howard Weiss

Art Unit

2814

All participants (applicant, applicant's representative, PTO personnel):

(1) Howard Weiss

(3) \_\_\_\_\_

(2) William Brooks

(4) \_\_\_\_\_

Date of Interview: 05 July 2005

Type: a) ☐ Telephonic b) ☐ Video Conference  
c) ☒ Personal [copy given to: 1) ☐ applicant 2) ☒ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.

If Yes, brief description: \_\_\_\_\_

Claim(s) discussed: all pending

Identification of prior art discussed: freestone

Agreement with respect to the claims f) ☒ was reached. g) ☐ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: \_\_\_\_\_

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

As need that specifying the axis is ~~normal~~ normal to the plane would overcome the rejection. The principal axes are one perpendicular to the principal plane and two axes parallel to the principal plane. These three axes are the principal axes. Applicant is invited to show what support for that the axis of interest is normal to the plane.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

Examiner's signature, if required